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COVER: An HH-46D Sea Knight helicopter picks up a pallet of supplies from USS *Theodore Roosevelt* (CVN-71). Providing surgical care is another vital aspect of modern carrier operations. Story on page 14. Photo by PHAA Jeff Phillips.

Cobra Gold
MEDCAP

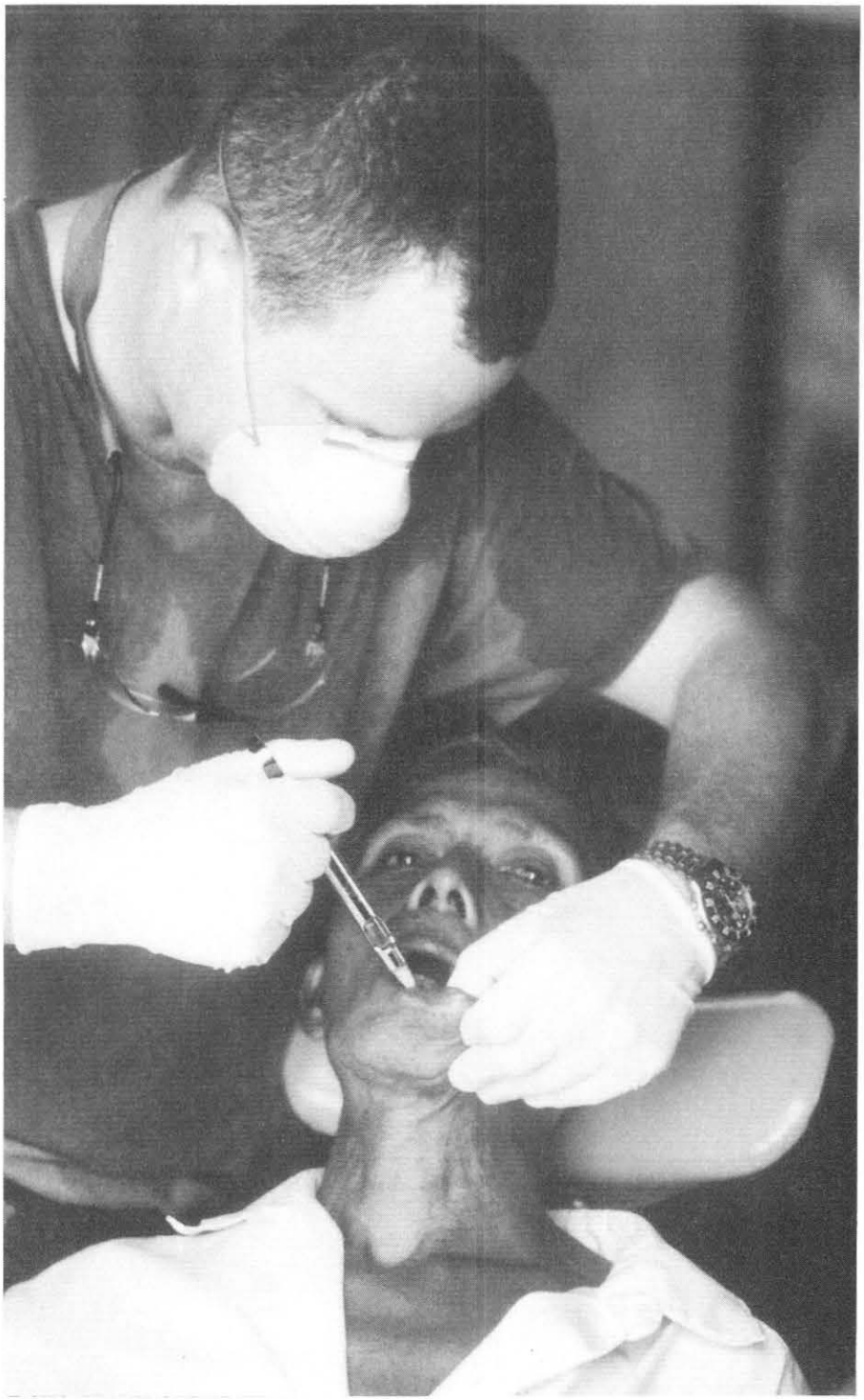
HM2 Derek Sauer and HM2 Aaron Vandall of the 3rd Medical Battalion, Okinawa, administer fluid to a Thai child.

The Medical Civil Action Project (MEDCAP) provides medical care in rural and underserved Thailand. MEDCAP teams validate Thai requests for assistance and work with the Royal Thai Military to carry out the mission. MEDCAP is funded by Title X, U.S. Code 40 funds which provides for combined U.S. and Thai military interests and training for U.S. personnel.

The MEDCAP team is a joint service effort of Army, Navy, Marine Corps, and Air Force personnel, and is combined with personnel of the Royal Thai Military forces. One-half of the MEDCAP personnel are reservists. There are two MEDCAP teams, each with approximately 40 personnel.

Each team will visit 10 villages during the MEDCAP. Three hundred to 600 patients will be seen every day. The Psychological Operations teams visit each site the day before the actual MEDCAP and announce the

Below: **CAPT Margaret McTighe of 351 Civil Affairs gives vaccine to a cow.** *Right:* **LT John Dingman of the 3rd Dental Company, Okinawa, injects lidocaine into a Thai villager.**



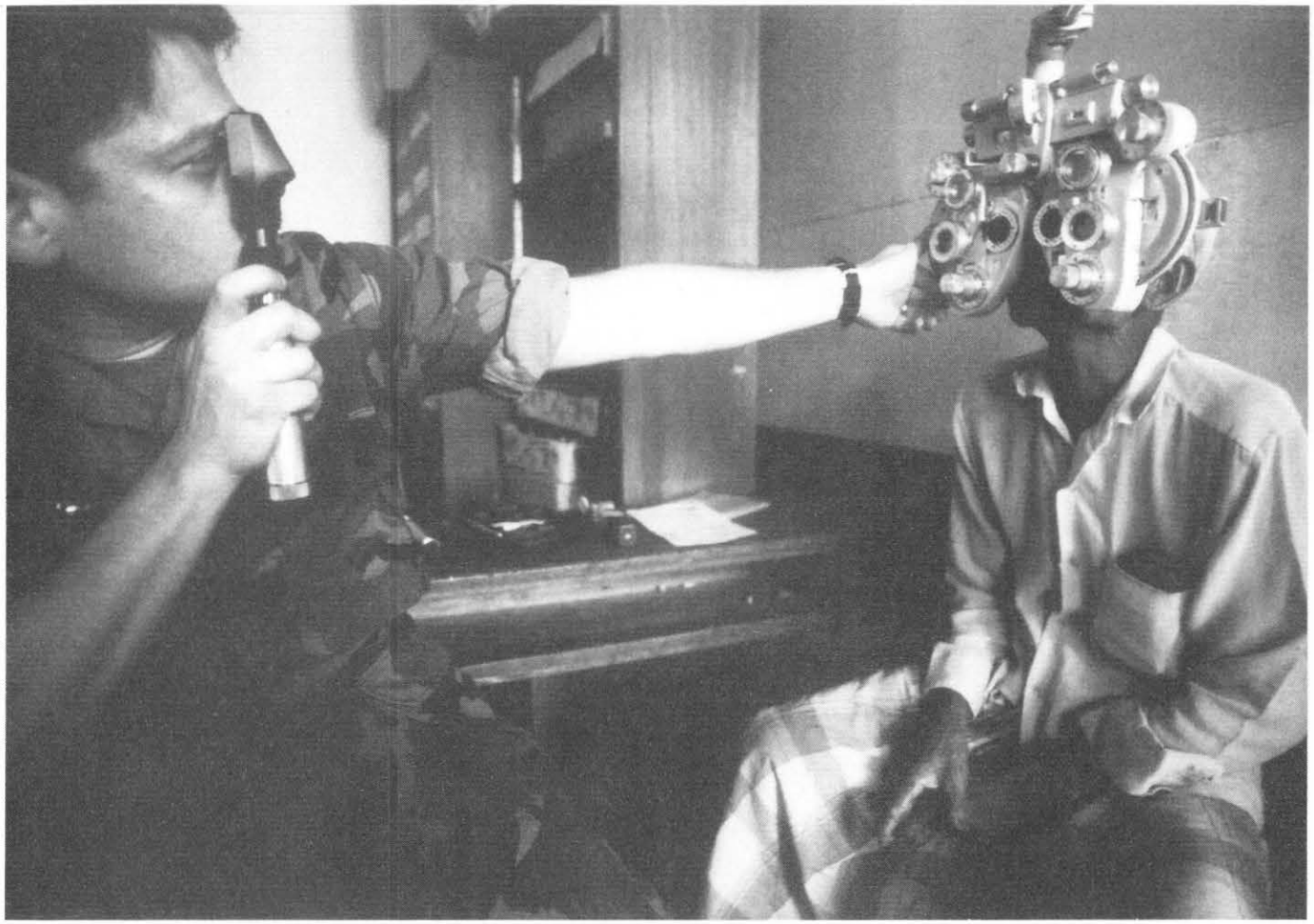
MEDCAP visit with speakers and pamphlets. Local Thai public health officials are contacted to coordinate medical aspects of the visit and assist with assessment and translation. Thai military medical personnel accompany each team to provide translation and medical expertise.

Hands-on medical care is coordinated by the physician staff assisted by their nurses and enlisted providers. After patients are assessed, they are triaged (directed) to one of the clinical resource areas. These areas include primary care medicine, physical therapy, dental, optometry (eye exam), and pharmacy.

The optometry group screens for eye diseases and provides eyeglass fabrication with portable equipment and personnel from the Navy Optical Lab. The dental team performs extractions and provides toothbrushes and dental education. The physical therapists assess musculoskeletal disorders and provide injury prevention instruction. Pharmacy provides medication and written and verbal instructions.

The prime focus of the MEDCAP is evolving toward training. The public health team and veterinarians provide assessment of water sources, hygiene lectures, pesticide safety, and mosquito control. Collection of specimens is coordinated by the personnel from Navy Environmental Protection Unit 6.

This MEDCAP, in conjunction with Cobra Gold '96, provides a unique training opportunity for medical personnel who must plan, supply, train, and execute a mission in remote and austere conditions. They learn



Above: **LCDR Adrial Lopez of Fleet Hospital 21 checks the eyesight of a local Thai patient.** ***Left:*** **CAPT Michael Baker of Naval Reserve Fleet Hospital 2 passes out dental hygiene supplies to villagers.**

how to deliver medical care in a field-expedient fashion and gain experience in humanitarian and civil affairs operations. This mission is joint service and combined with allied forces is another extremely valuable training aspect of the mission, as well as a unique and unforgettable cultural experience that cements relations between the United States and the Royal Kingdom of Thailand. ❑

—Story by CAPT Michael S. Baker, MC, USNR, Naval Reserve Hospital 2. Photos by PH1 Stephen Baitz.

Joint Task Force — Medical Treatment Facility Fleet Surgical Teams

CDR Billy Rice, NC, USN
LT Paul Harper, MSC, USN

Sometimes it's difficult to appreciate just how far Navy medicine has come and the many changes that have occurred over the years. At one time, operational commitments by Navy medicine were fulfilled by Mobile Medical Augmentation Readiness Teams (MMARTs). This team of professionals, from designated hospitals, would be tasked to support any number of contingencies. Having been a member of numerous MMARTs, one can say that there are numerous shortcomings to their usage on a regular basis. To minimize the turbulence within medical treatment facilities (MTFs) caused by deploying staff members, Fleet Surgical Teams (FSTs) were created.

History

FSTs were established to increase the effectiveness of fleet medical and surgical support by creating fully dedicated assets specifically designed to provide a forward, advanced surgical capability for a deploying Amphibious Ready Group (ARG). FSTs provide medical and surgical support to designated operating forces of the Pacific and Atlantic Fleets during fleet and Fleet Marine Force (FMF) exercises and deployment of routine ARGs. FSTs are normally deployed on the ARG Casualty Receiving and Treatment Ship (CRTS)/Flagship.

Listed below is the chain of command for FSTs:

(1) Chief of Naval Operations (CNO)

(2) Commander in Chief, U.S. Atlantic/Pacific Fleet

(3) Commander, Naval Surface Forces (Atlantic/Pacific)

(4) Commander, Amphibious Group

(5) Officer in Charge, Fleet Surgical Team

Currently, there are three FSTs assigned to each coast. The west coast teams are stationed out of the San Diego Amphibious Base, CA, and the east coast teams are from Little Creek Amphibious Base, Norfolk, VA. During FY96, a proposed fourth Surgical Team will be assigned to each coast.

Each FST has personnel to augment the amphibious platform to which it is deployed. The following is a list of the specialized officers and enlisted team members:

CATF Surgeon (FST OIC)—1 MO
Admin/Med Regulating—1 MSC
General Surgeon—1 MO
Family Practice—1 MO
Anes Provider—1 CRNA/MO
OR Nurse—1 NC
Ward/ICU Nurse—1 NC
Resp Tech—1
Adv Lab Tech—1
OR Techs—2
0000/8404 HM's—5

Photos by PH1 Scharf and PHAA Williams

A ward on *Guam* illustrates the premium put on space aboard a naval fighting vessel.

The first four FSTs were established by each Commander in Chief (CINC) of the Pacific and Atlantic coasts under direction from the CNO. FST-1 and FST-3 were created on the west coast and FST-2 and FST-4 on the east coast. In April 1992 the CNO sent a letter asking for an additional FST on each coast, resulting in the introduction of FST-5 and FST-6.

There are two unique positions within the FSTs. These are the Officer in Charge of the FST which assumes the role/title of Commander Amphibious Task Force (CATF) Surgeon and the Administrative Officer who assumes the role of Medical Regulator.

CATF Surgeon

The CATF Surgeon becomes part of the COMPHIBRON staff. In the planning of an amphibious operation, the CATF and the Commander Landing Force (CLF) each has specific medical support planning responsibilities. Both the CATF and CLF Surgeons and their staffs must have a thorough understanding of these mutual responsibilities.

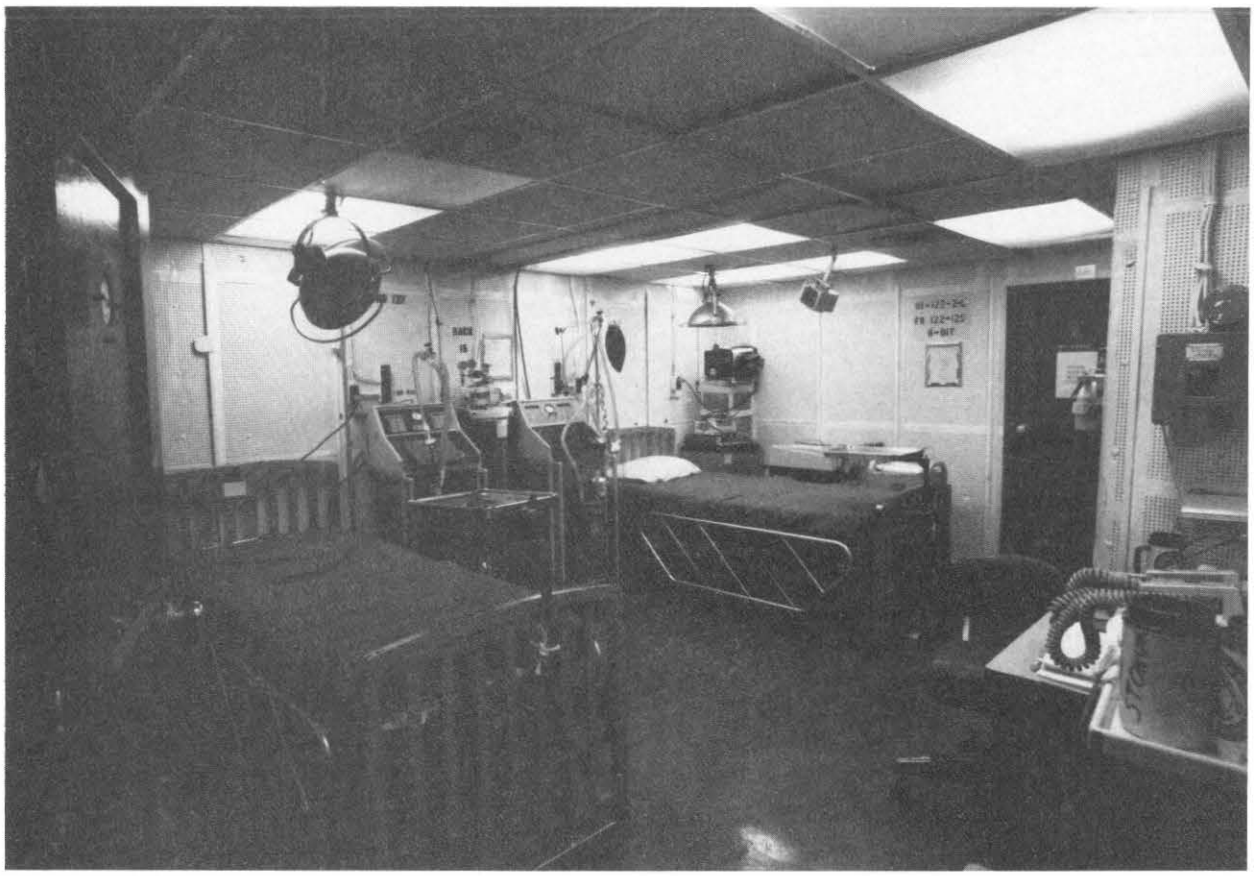
The CATF is responsible for the following and prepares plans accordingly:

- Providing medical support for all embarked personnel between points of embarkation and the objective area.
- Provisions of medical personnel, supplies, and equipment for all naval units based ashore and not attached to the Landing Force.
- Seaward evacuation from the beaches, receipt of patients, hospitalization afloat within the objective area, and initial casualty reporting for Navy, Landing Force, and other forces assigned.
- Coordinating the evacuation, by ship or air, from the objective area to medical facilities outside of the objective area.
- Coordination for air transport of medical supplies and equipment.
- Formulation, in conjunction with the CLF Surgeon, of an evacuation policy for all operation.
- Establishment of medical requirements and standards for the civilian population in the objective area, when these are not prescribed by higher authority.

Medical Regulator

Normally assigned to the ARG Flagship, the Medical Regulating Control Officer (MRCO) coordinates medical regulating throughout the task force and is net control on the medical regulating net. He also coordinates/consolidates all requests for aeromedical evacuation from the objec-

ICU aboard *Guam*



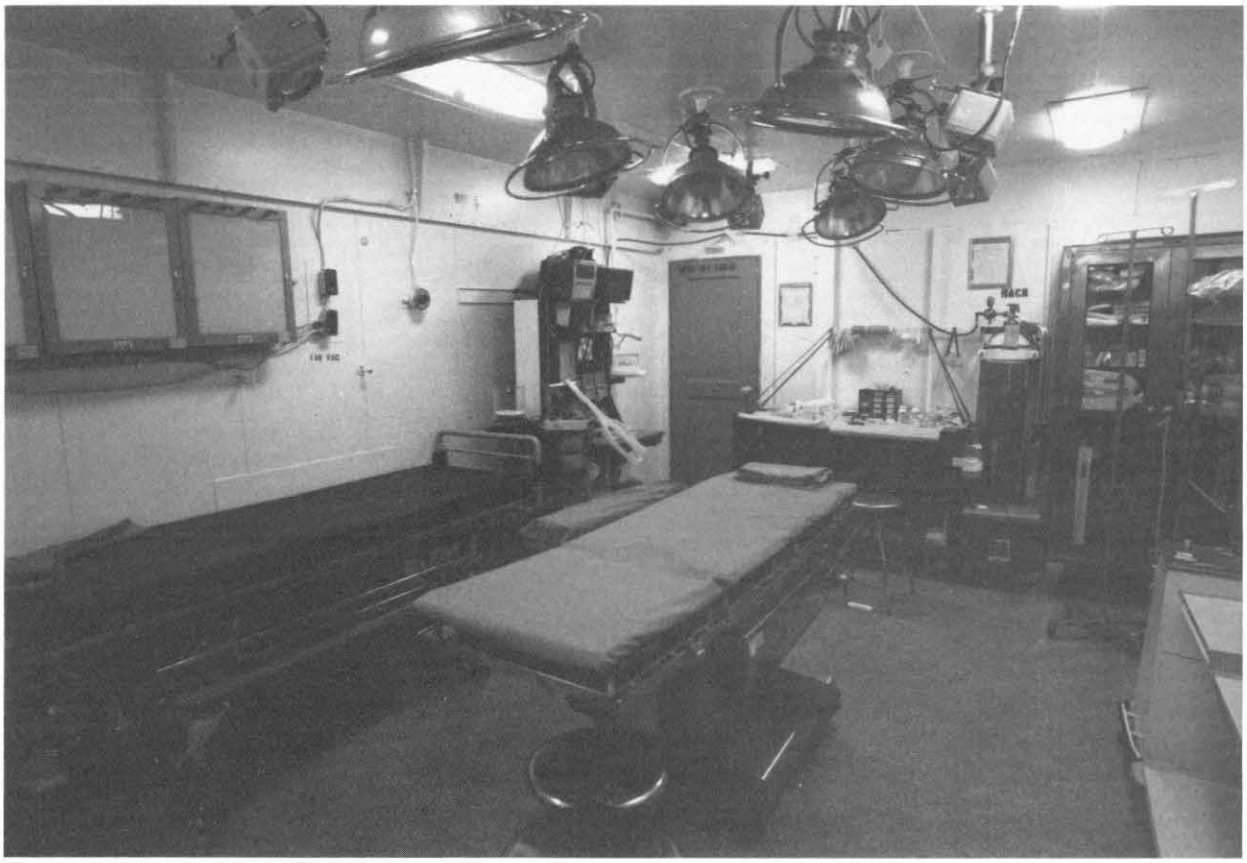
tive area. Other responsibilities of the FST MRCO are:

- Provides detailed planning and ensures that the requirements for medical regulating satisfies the Amphibious Task Force operation orders.
- Maintains the master facility spot status board.
- Advises the Helicopter Direction Center (HDC) and Primary Control Ship (PCS) on the preferred destination of casualties. Such decisions consider care required by the patient and the MTF capability.
- Notifies the intended MTF of inbound casualties and any available information.
- Initiates all message traffic regarding casualty evacuation.

Mediterranean Amphibious Ready Group (MARG) 1-96. FST-6 embarked on USS *Guam* (LPH-9) on 23 Oct–9 Nov 1995 and 29 Nov–16 Dec 1995 for its workup cruises. It deployed for a 6-month cruise in the Mediterranean Sea (26 Jan 1996–26 July 1996) with USS *Portland* (LSD-37), USS *Tortuga* (LSD-46), and USS *Trenton* (LPD-14). The embarked Marine detachments include the Marine Expeditionary Unit Command Element, an Air Combat Element (ACE), a Battalion Landing Team (BLT), and a MEU Support Service Group (MSSG). The number of deployed marines and sailors for MARG 1-96 was approximately 3,800. MARG 1-96 was scheduled to participate in joint amphibious operations with several countries while at sea. *Guam* was the designated CRTS for MARG while under way. FST-6 provided echelon II care and transport personnel from all four ships of the ARG that might require evacuation to higher levels of care.

The Challenge

As the photos succinctly illustrate, *Guam* is one of the oldest amphibious platforms currently being utilized by the Navy/Marine Corps team. Storage space along with adequate work space is at a premium. Inventive and flexible alternatives had to be created to provide the best possible medical care for the MARG. In the past there has been a distinct separation of medical assets. These assets are: (1) CRTS medical personnel, (2) FST personnel, (3) MEU Command Element medical personnel, (4) BLT medical personnel, and (5) ACE medical personnel. To provide a more uniform approach to medical treatment, the east coast Amphibious Group Command has prescribed that these members will be under the authority of the medical officer of the CRTS with overall guidance from the CATF Surgeon.



OR aboard *Guam*

To put this issue into a managerial perspective, let's review the interaction of FSTs and CRTS personnel. As noted previously, the FST personnel are all specialists with a primary focus in hospital-based patient care. The five 0000/8404 corpsmen are all cross-trained, from ward care to ICU to orthopedic cast room experience. The CRTS (LPH) medical personnel are:

Physician (GMO)—1
Chief (Pharmacy Tech)—1
Independent Duty Corpsman—1
Preventive Medicine Techs—2
X-ray Tech—1
OR Techs—2
Aviation Med Tech—1
Biomedical Repair Tech—1
Med Admin Tech—1
0000/8404 HM—1

In the past, when east coast FSTs have embarked on their respective platforms, there has been differing levels of cooperation between the CRTS and FST personnel. Each "department" views their role/mission as sometimes separate. Currently, the term "integration" is used to identify how these two unique medical assets are married to the larger mission of providing health care to the Navy/Marine Corps Team.

Life at Sea

For those who have never served aboard an underway ship before, the experience is at once exhilarating and boring/monotonous. Reflect for a minute what the experience is really like. The personnel embarked are your only assets, truly. Everyone else on the ship has their specific areas of expertise. There is no writing or calling the next higher specialist to help solve a problem. The supplies on board are the ones that will carry the ship through any surge of patients, no matter what the problem. Viewing the pictures of the medical department working spaces, one can begin to appreciate the tremendous vision and flexibility each member must have to accomplish to provide good patient care. No one goes home after an 8-10-hour day. Every medical department team member works, eats, plays, and supports one another.

As the business of FSTs becomes more organized and the experience pool enlarges, the challenge of providing great health care to the fleet becomes a reality. BUMED has continued to make great progress toward improving the practice of operational medicine. ❑

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Future Challenges for Operational Medicine: Care of the Echelons

Gary E. Horne, D.Sc.
Neil B. Carey, Ph.D.
Cori R. Rattelman

Spurred by changes in operational concepts and given emphasis by innovations proposed in the newest *Medical Readiness Strategic Plan,*(*1*) Navy medicine is currently engaged in a number of efforts to shape the future of operational medicine. For example, the CINCPACFLT Surgeon, MARFORPAC, and Seventh Fleet are sponsoring an *Operational Medicine Studies Group;* RADM Noel Dysart, MC, has convened *FH 2010,* a group to redesign health services for the 21st century;(*2*) OASD(HA) assembled an 18-month study *MHSS 2020,* headed by RADM William Rowley, MC, to envision the future of all aspects of military health care delivery; the CNO, N-093M, N-931, and Naval Doctrine Command, Health Service Support Detachment, gathered a group to study Expeditionary Health Service Support;(*3*) and marines and sailors from the Second Medical Battalion, Second FSSG, MARFORLANT at Camp Lejeune, NC, recently field-tested proposed changes in the medical battalion.(*4*)

Concurrently, warfighters are developing new concepts for fighting, such as Operational Maneuver from the Sea (OMFTS).* The implementation of these new concepts will have vast implications for the Navy/Marine Corps team in the management of combat casualties in the future.

This article describes the outcome of a related effort by the Center for Naval Analyses (CNA) to identify and prioritize the issues that Navy medicine must deal with as it looks toward the future.(*5*) Even without the CNA and other studies, changes in ship-to-shore assets alone will force Navy operational medicine to respond. The LCAC (landing craft air cushion) is already here and the Advanced Amphibious Assault Vehicle and V-22 Osprey tilt-rotor aircraft are expected soon.

How will the Navy/Marine Corps team manage combat casualties in the future? Ideally, the warfighting and medical communities will answer this question together with shared understanding that translates into better care for combat casualties and a more efficient fighting force. But what are the underlying issues that must be addressed in the area of combat casualty management in the future?

A great deal of information to help frame these issues is contained in overarching publications, such as *Forward . . . From the Sea,* current doctrinal publications on operational health service support, and concept papers on OMFTS. In looking to the future, however, we found that per-

*OMFTS will be described in detail later in this article.

Under OMFTS an LHA will sometimes be the first place a marine can receive surgical treatment.

haps the most important sources of information are experienced military personnel.* We tapped these sources to create a vision of the future and understand the challenges and possibilities they saw for combat casualty care.

We asked our participants to "think outside the box" because we wanted to consider all of the ideas that might be out there. We wanted to think unconstrained by preconceptions about how medical support should be handled. Good ideas often are born from past experience, but we wanted to understand how they might apply to the future, without being limited by narrow assumptions.

Figure 1 illustrates our four-step method for getting at the issues. During the first step of our process, we wanted to understand the background—the goals of both warfighters and medical. In the second step, we wanted to know what people thought were the underlying characteristics of the battlefields of the future. In step 3, we wanted our participants to articulate possibilities, or ways in which we might move forward to meet the challenges of these future battlefields. The final step was for our study team to synthesize these possibilities, sets of possibilities, and challenges inherent in the possibilities into areas that need a closer look as we move to the future.

Background

While the bottom line for warfighters is to impose their will on the enemy, the bottom line for medical is to do its job of returning personnel to duty and saving lives. Doing so should allow the warfighters to focus on their objective. This focus is especially important in the fast-paced action envisioned under the OMFTS concept. Medical personnel want to provide high-quality care to casualties as quickly as possible. They also want to provide the highest possible quality of care in any situation.

Characteristics

We asked our participants to describe the characteristics of the future battlefield. One set of responses reflected the characteristics of OMFTS.

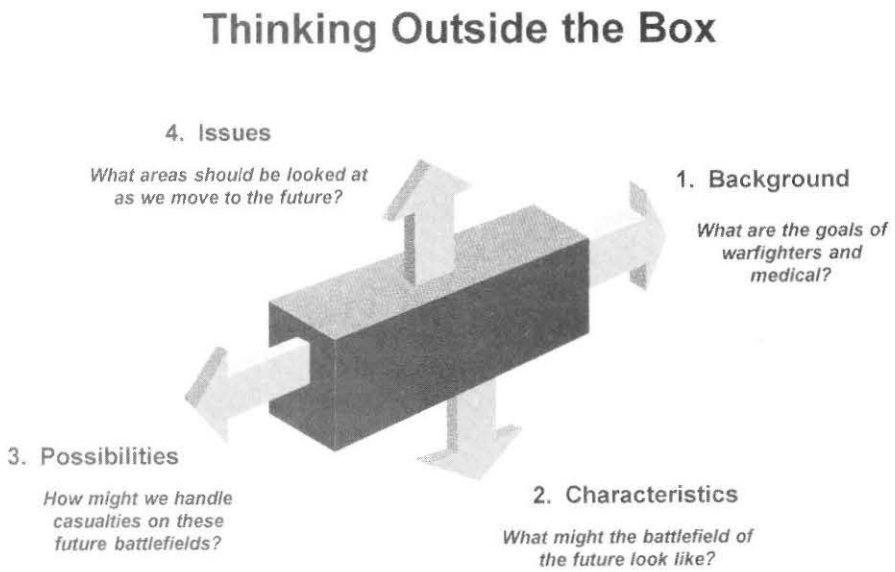

Figure 1

*We spoke with personnel from Marine Corps Combat Development Command (MCCDC) Concepts Branch, Naval Doctrine Command, MCCDC Combat Medical, USMC Installations and Logistics, Army Medical Plans and Operations, Army Medical Center Concepts, J-4 Medical Readiness Division, OASD Health Affairs Readiness, I MEF, II MEF, PHIBGRU-2, and many BUMED codes.

In some circumstances OMFTS will require small teams of marines to perform special operations far from the host ship.

Under OMFTS, the troops will be highly dispersed, and our side may have smaller or no vital areas ashore. The force will be extremely mobile and flexible to changing conditions. Engagements will be short and sometimes violent. Units will be smaller and operate more independently, making decisions on the spot as they react to the situation at hand. Perhaps the key characteristic here will be uncertainty, starting with uncertainty as to geographic location all the way through to what might happen at any given time and place while carrying out the mission. And finally, while the future will bring greater command, control, communications, computer, and intelligence capabilities, the requirement for C41 in the OMFTS environment will also be greater.

The second set of characteristics stem from changes we expect as we move to the future—whether or not we are fighting under the OMFTS concept. In the future, we expect to see a different casualty profile. For example, we expect to see more civilian casualties, especially when fighting takes place in urban environments. Also, more women in combat will change the combat casualty profile. We also expect to see a real mix of wounds due to futuristic weapons, such as lasers; traditional or even primitive weapons; and chemical and biological warfare. Finally, disease and nonbattle injuries (DNBIs) will be extremely important to deal with as we fight in assorted austere environments.

When these two sets of characteristics come together, we see yet another trend emerge (see Figure 2). Our participants predicted a battlefield that will present what might best be described as a problematic array of casualties. The casualties might be mixed with the enemy in highly dispersed pockets. The size of these pockets may be most likely one or two, but in certain cases a multitude (including civilians and the enemy) could be found due to weapons of mass destruction. The mix of injuries across the battlefield would necessitate readiness to provide casualty care for a large variety of injuries not typical of past conflicts. On top of all these variables, the uncertainty inherent in this mix may cause delays in appropriate decision making regarding casualty management.

Finally, surrounding all of these characteristics is the changing context in which combat casualty management will take place. The information age is here—communication at all levels is fast and furious. We have already seen some of the effects of a large and visual media presence in the Gulf War. The American public will have an increasingly direct effect on the decisions made by political leaders. They will also have increasing expectations for casualty care just as they do for health care in general. We may also be operating in a context where the enemy observes no rules or has no internal restraints regarding actions ranging from the use of weapons of mass destruction to targeting a hospital. Finally, and perhaps with the most implications for combat casualty management, we are moving to a time when operations will be more joint in nature and more will be combined.

Characteristics of the Future Battlefield

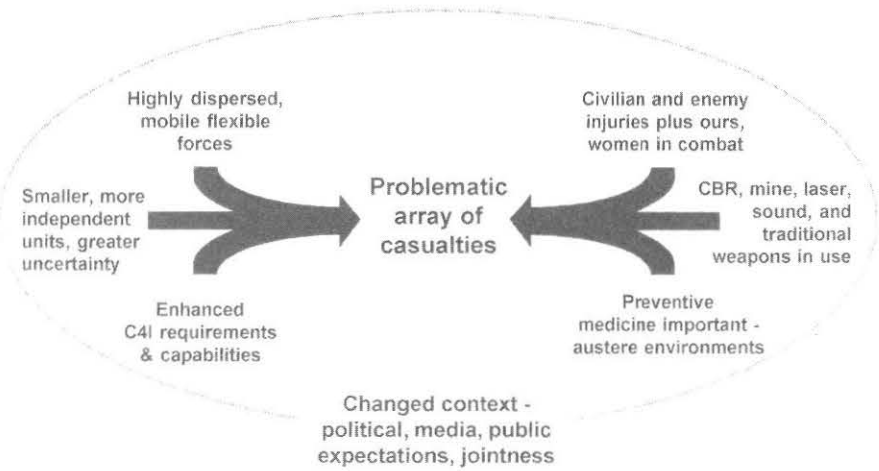

Figure 2

Possibilities

We fielded literally hundreds of responses to the question, "How might we handle casualties in these future battlefields?" Figure 3 summarizes the answers we received. The spectrum of ideas ranged from very futuristic to very traditional, as well as from very specific to very general.

During our information collection, many people spoke of the world of combat casualty management as a dichotomy—either you take the casualty to care or you bring care to the casualty. They described the basic trade-off between the two. When you bring more care to the casualty, you have more medical personnel, more training requirements, more equipment, etc. When you take the casualty to care, i.e., evacuate, it takes time. Put another way, the pull is between the depth and breadth of care available on site versus the time elapsed before you can provide the needed care off site.

Prevention is at the core of the combat casualty care world. If effective prevention measures are applied for both infectious disease and chemical and biological injuries, then precious resources are freed for other combat casualty care.

Finally, technology is expanding the world of possibilities for combat casualty care. Care and the casualty can be brought together in new ways through new technology, such as telemedicine.(*6,7*)

Issues

We took the information that we collected on the characteristics of future battlefields and the resulting possibilities for managing combat casualties on these battlefields and synthesized the information into a list of 10 broad issues.

The first is the overarching issue of changing the system of care as we move to the future in an OMFTS type of environment. The echelons-of-care system seems appropriate for the old linear way of fighting, but in the future we need to rethink the system because of the new casualty profile. We need to go from the medical-centered and linear echelons-of-care system to a casualty-centered, flexible system. Many former ways of thinking must be completely turned around, thus, we like to refer to this new concept of casualty care as "care of-the-echelons" system.

Of course, this new system might include components of the old. And certainly the trade-offs between taking the casualty to care or bringing care to the casualty must be studied. Among the issues we identified, evacuation, communications, technologies, and deployable platforms are all closely tied to taking the casualty to care. And casualty-site care, prevention, CBR (chemical, biological, and radiological) casualties, and logistics are linked closely with bringing care to the casualty. But we found through our many discussions that there is a great deal of overlap between all of these issues. A common thread running throughout was the issue of interaction and the resulting understanding between the warfighting and medical communities, which is essential to answering all of the questions as we move to the future.

System. Because future combat environments might be so different, we were often told that major parts of the system of echelons of care need to be revamped. But different respondents had different ideas about how the system should be changed. For example, some told us that the battalion aid stations might be inappropriate in many cases. Others felt that the mobility of health service support ashore must be raised to the level of the warfighters. Some thought that echelon II should be eliminated—moving some capabilities forward and some back. Respondents also said that there should be mobile medical squads/platoons with organic trans-

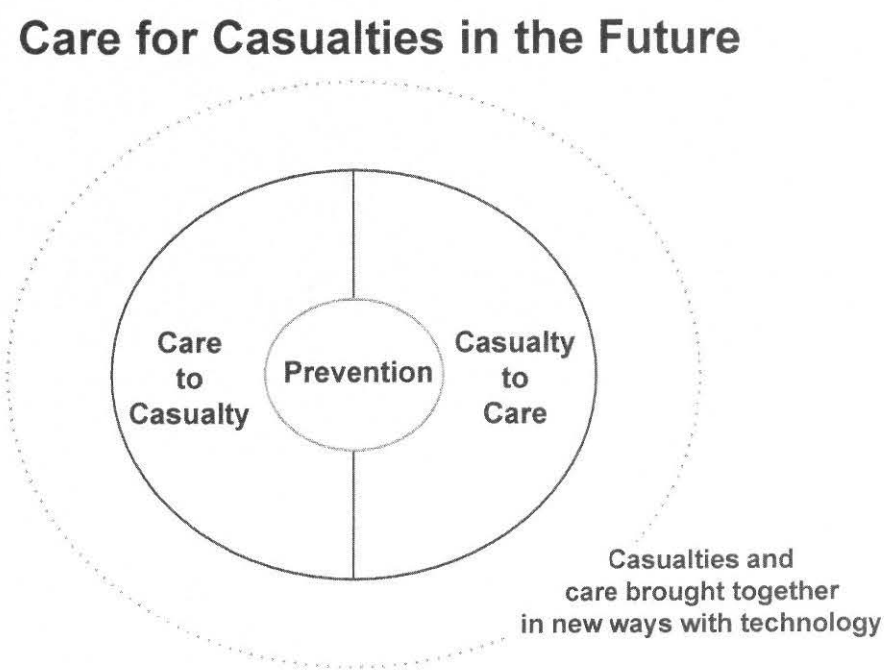

Figure 3

portation assets, designated Marine Corps medical evacuation units, and more medically capable amphibious ships.

Because there is agreement that the system needs to change, but no consensus about specific details, the Navy is wise to be rethinking the doctrine, organization, and roles of medical in future combat in efforts such as those mentioned earlier.

Evacuation. Maneuver warfare will require evacuation platforms that have enhanced ability to locate casualties and protect themselves. Because of the larger distances involved in OMFTS, these evacuation platforms will also need to be faster and have longer range than those used currently. For example, the CH-46's range is considerably less than what medical might routinely need under OMFTS.

Further study of evacuation platforms should consider organic Navy/Marine Corps alternatives, such as a fast-to-implement Marine Corps Expeditionary Shelter System (MCESS) for LCACs (to be used on both water and land), improved ground ambulances, and "care-in-the-air" enhancements to organic Marine Corps and Navy helicopters. Nonorganic assets, such as the Army's model UH-60Q Blackhawks, should also be considered.

Communications. The distances and speeds of movement under OMFTS will make it more difficult to communicate for medical and line purposes. But the communications assets available will be more powerful than those that we now have. It is important that medical anticipate, focus the development of, and exploit new communication and information technologies.

Without a definitive front line, casualties may not be as concentrated as before. Instead, we expect to find casualties in a larger number of more highly dispersed locations. These characteristics will make it more difficult to do medical regulation, because there will be a larger number of pickup points to coordinate for the regulator. So the issue of communications should not be considered separately from information technologies that might help with the added complexity of regulating.

Technology. Technology is a broader field than communications and information technologies. There needs to be a bottom-up look of technology's role in future medical environments, taking into consideration the needs, not just what is already available.

Future technologies include a variety of possibilities. Under the label "telemedicine," these include teleradiology, telesurgery, televideo consults to doctors or corpsmen in the field, and a variety of administrative assistant technologies for identifying and locating casualties. Telemedicine also includes technologies for recording and saving information on casualties' medical histories, units, and treatments. Because of the potentials—both positive and negative—of new technologies, analyses of the appropriate and inappropriate uses of new technologies are needed.

Deployable Platforms. As we said before, there was a sense that the new combat environment under OMFTS would be very different from what we have today. Therefore, deployable medical platforms need to be reassessed. Do they need to be redesigned, to have different capabilities than we have at present? For example, are the hospital ships too labor-intensive to be an economically feasible platform? Or do new operational requirements make economic feasibility irrelevant in that they may be the only large and highly capable medical support available for new operational concepts?

Clearly, a decision about which platforms are best depends on the type of mission. Medical and warfighters should consider alternatives, including various OMFTS scenarios, more traditional attrition-based amphibious operations, and military operations other than war.

Casualty-Site Care. Greater distances and the use of smaller more independent units will stress the evacuation system. In addition, the lack of forewarning and the short duration of operations may limit the ability of medical to establish large ground and/or sea platforms to evacuate casualties to. For these reasons, many participants felt that initial treatment and other casualty-site care would become even more important under future scenarios.

Given this emphasis on casualty-site care, Navy medicine must examine whether the current skill mix of medical personnel will allow the flexibility necessary to support the warfighter on the future battlefield. Participants recommended a range of increased skill requirements that might be needed at the casualty site. These recommendations could be represented by a continuous spectrum with the infantryman at one end, moving up to the corpsman, and finally the physician.

Ideas include increasing the self/buddy aid skills of all infantrymen, training a select group of the infantry to support the hospital corpsman (such as is done in the Army's "combat lifesaver" program), enhancing corpsman training to reflect that of an independent duty corpsman or a physician's assistant, as well as increasing the combat skills of medical officers so they could be moved closer to the scene of conflict.

Prevention. Historically, the downfall of many military forces has been the result of disease rather than direct

combat with opposing forces. We might expect this trend to continue as we are faced with potential conflicts in more austere environments. Investments in preventive measures (vaccines, detection methods, intelligence, and training) may be the best way to deal with the growing threat of chemical and biological warfare.

Often prevention of infectious disease and chemical and biological injuries is not given the appropriate level of priority in the minds and budgets of the warfighting community. Military forces sometimes succumb to infectious disease due to the failure to integrate basic sanitation and medical prevention procedures. Bringing prevention to the forefront of the commanders' minds may provide the most "bang for the buck" in ensuring the integrity of the forces. Other possibilities include (a) rapid diagnosis capabilities that could be used far "forward" to detect and combat the use of biological weapons and (b) an automated system to track illness patterns to detect potential threats before they become extensive and force degrading.

CBR. Some important questions regarding CBR are as follows: How do we deal with decontamination, and to what extent should that be the responsibility of medical? What is the status of detection capabilities, and how do we put that information to use? Can we train infantrymen to carry and administer their own vaccines/treatments when necessary? How can we best disseminate information and train to combat the morale effects of CBR on the medical community and the troops?

As with prevention, there are many questions to answer, but perhaps the most overarching is determining the appropriate level of priority that should be given to preparing for the CBR threat.

Logistics. Executing OMFTS poses considerable logistic challenges. These create additional stress on the medical support system. Perhaps the biggest priority for medical logistics will be to reduce the weight of class VIII supplies. Several studies and initiatives are under way within the logistics community that address this priority, as well as efforts to reduce or control the costs associated with buying, maintaining, managing, and disposing of class VIII supplies. What we found to be one of the biggest problems is the lack of communication between the players involved in efforts being undertaken and the advancements being made within logistics. The Navy/Marine Corps team could benefit from a thorough survey of these efforts.

Interaction. Finally, a theme that ran throughout the project was the need for more effective interaction between the warfighters and medical. Navy medicine must have a clear understanding of the support that Marines expect and require for all missions of the Corps (peacetime, forward deployment, regional conflict, OOTW, etc.).

In turn, the warfighter and the other support communities must strive to work with and understand the needs and capabilities of the medical community. For example, the importance of preventive medicine, field sanitation, and the inclusion of medical in field training exercises.

Conclusion

The nature of the Marine Corps has always been to achieve the maximum amount of multiple use for any asset. Under OMFTS, this concept becomes even more valuable. As we move into the future, we must look for commonality in the communications, technology, transportation, and logistic support systems required by the warfighters, medicine, and the other support services. But we must also think of the process, the development of ideas, and the implementation of those ideas, as assets to be shared among all of these communities. Therefore, the Navy/Marine Corps team needs to ask if there are any doctrinal or organizational changes that could be made to encourage the integration of ideas and expectations of all communities throughout the combat development process. The goal would be for all players to contribute and work together to meet the challenge of providing the best possible care of the echelons of the future.

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USS *Theodore Roosevelt* and her battle group

Surgery at Sea

A 3-Year Review of Surgical Care on an Aircraft Carrier

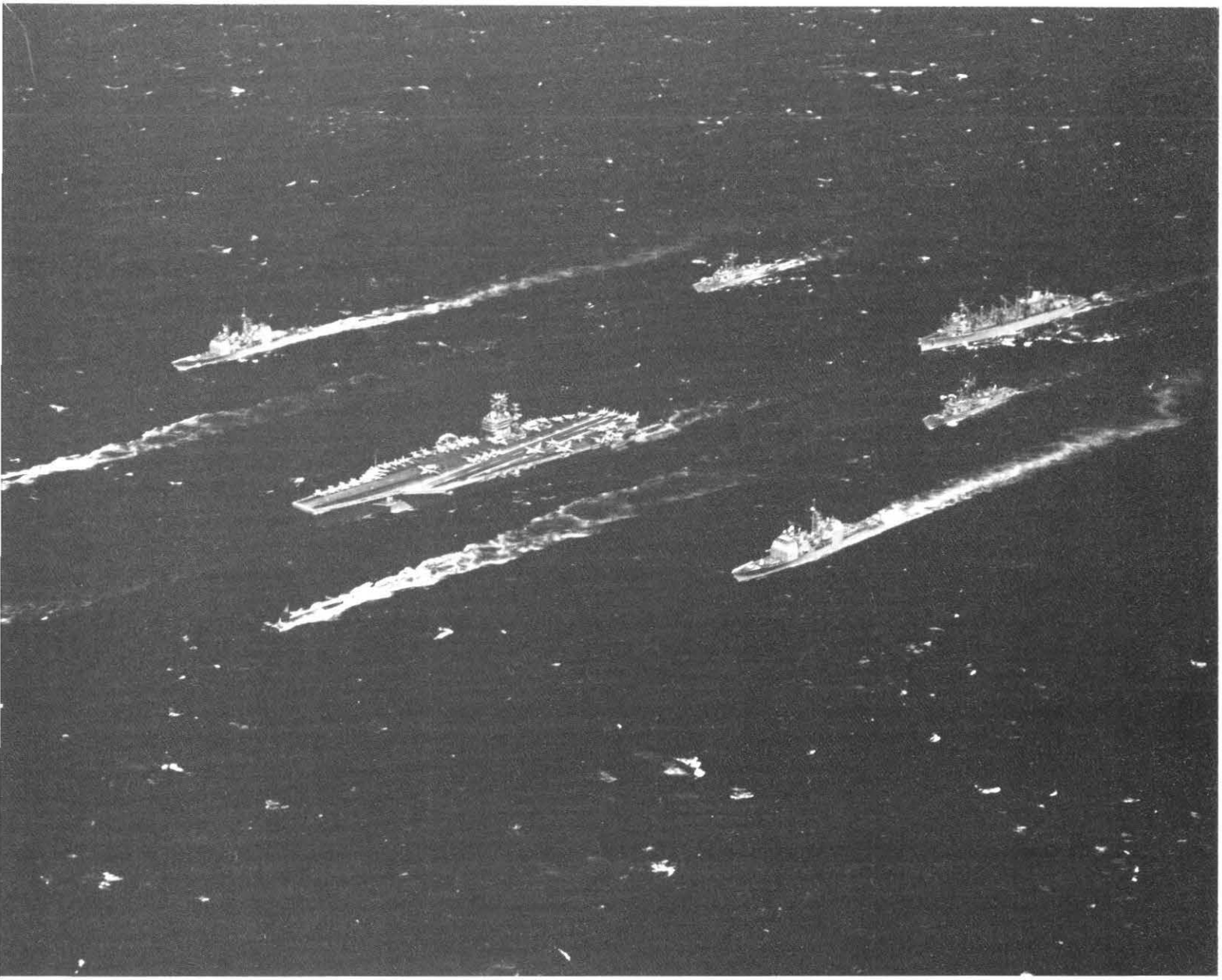
LCDR Joseph P. McDermott, MC, USNR
LCDR Matthew McCoucha, NC, USNR
HM1 Charles B. Wolfe (AW), USN

Medical support for an aircraft carrier plays an important role in keeping the command at a high level of readiness. Each carrier gets under way with a full surgical team as part of the on board medical support. The team includes a general surgeon, an anesthesiologist or CRNA, a registered nurse, hospital corpsmen trained as operating room technicians, and corpsmen trained in ancillary hospital services such as X-ray technology, laboratory services, and inpatient care.

This review looks at the use of the surgical asset in the operational setting. Analysis of past surgical experience at sea may allow for improved readiness of future surgical care afloat. In particular, this study may help surgical team members and support personnel anticipate the type and extent of surgical care delivered on an aircraft carrier.

Methods

A retrospective chart review of all admissions to the hospital ward aboard USS *Theodore Roosevelt* (CVN-71) from 15 May 1992 to 15 May 1995 was performed. Ward admissions are limited to seagoing periods. Admissions for surgical diagnoses were divided into general, orthopedic, hand, urology, and "other" categories. Elective surgical admissions were defined as encounters that could be postponed until return to port without adversely affecting patient care. All other admissions were considered non-elective.



All medical evacuations (medevacs) from the carrier to a land-based medical treatment facility (MTF) during the 1993, '94, and '95 predeployment "at sea" periods and the 1993 and 1995 deployment cycles were also reviewed. The decision for transfer was characteristically based on the need for acute specialty care not available at the shipboard facility. Another population of patients with subacute medical conditions needing prolonged convalescence were also sent to land-based facilities and included in the medevac population.

Results

There were 280 surgical admissions to the ward of the 595 patients admitted during the study period (47 percent). Elective surgical admissions comprised 76 percent of all surgical admissions, while 24 percent were considered nonelective. Of the 141 medical evacuations (from May 1993 to May 1995), 87 were related to surgical conditions (62 percent). A combined total of 733 inpatient encounters and medical evacuations occurred during the 3-year period of the review. Of this total, 352 (48 percent) were found to have a surgically oriented problem.

The most common reason for a surgical admission (elective and nonelective combined) involved a urologic condition. The vast majority of these admissions involved elective, minor surgical procedures such as vasectomy or circumcision. All patients having surgery requir-

Surgical Admissions by Subspecialty

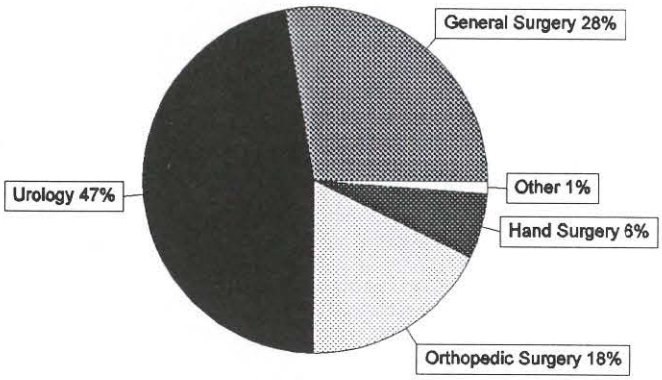


Figure 1

ing anesthetic support were admitted to the ward, regardless of whether or not they would be discharged the same day. General surgical conditions were the second most common reason for admission (28 percent). Orthopedic conditions accounted for majority of the remaining cases (see Figure 1 and Table 1).

Review of nonelective surgical admissions to the medical ward revealed a different distribution of surgical diseases. General surgical problems were the most common nonelective admission (45 percent), followed by orthopedic (26 percent), hand surgery (10 percent), urologic (13 percent), and other (6 percent) (see Figure 2).

Orthopedic injuries were the most common surgical reason for medical evacuation from the underway carrier (58 percent). General surgery accounted for 20 percent of medevacs, hand surgery was needed in 13 percent, and urologic consultation in 9 percent (see Figure 3).

Surgery at Sea

Anesthesia. A total of 237 surgical procedures using anesthetic support was performed during the 3-year period reviewed. Local anesthesia, with or without the addition of sedation, was used in 123 cases (52 percent). A regional anesthetic block was used in 17 (7 percent), a spinal or epidural block was employed in 76 cases (32 percent), and general anesthesia was used in 21 (9 percent).

Antibiotic Use. Antibiotics were used in 15 percent of all surgical admissions. A first generation cephalosporin was the most commonly prescribed antibiotic (Cefazolin) followed by Ampicillin and Gentamicin. No allergic or adverse reactions to antibiotic administration was noted during the review.

Blood Use. Two patients were urgently transfused whole blood during the study. In each case, blood was obtained through the ship's "walking blood bank" collection process. Each patient received two units of blood before being transferred to a land-based facility. The first patient was bleeding from a peptic ulcer. The second was bleeding from a Mallory-Weiss tear.

Operative Morbidity and Mortality. Of the 237 operations reviewed, operative complications were identified in 12 (5 percent) (see Table 2). One death was noted during the study period. This patient underwent an

Table 1
Surgical Procedures

Vasectomy	106
Circumcisions	51
Inguinal Hernia Repair	23
Hemorrhoidectomy	9
Ganglion Excision	9
Mastectomy	8
Appendectomy	7
Pilonidal Cyst Excision	6
Exploratory Laparotomy	2
Ventral Hernia Repair	2
EGD	2
Suprapubic Cystostomy	1
Vein Stripping	1
Thoracostomy Tube	1
Tendon Repair	1
Other	8

Nonelective Ward Admissions by Subspecialty

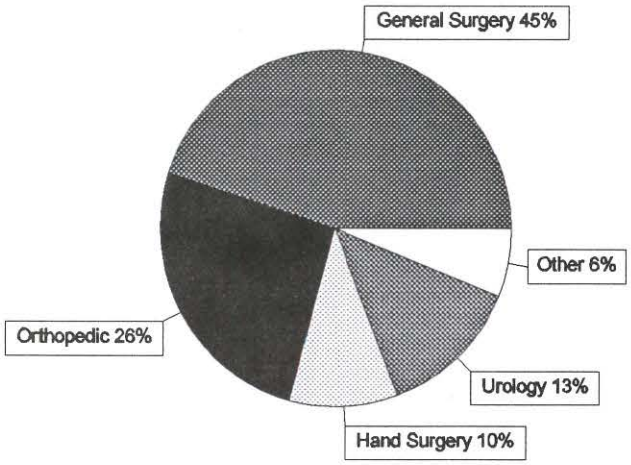


Figure 2

Medical Evacuations by Surgical Subspecialties

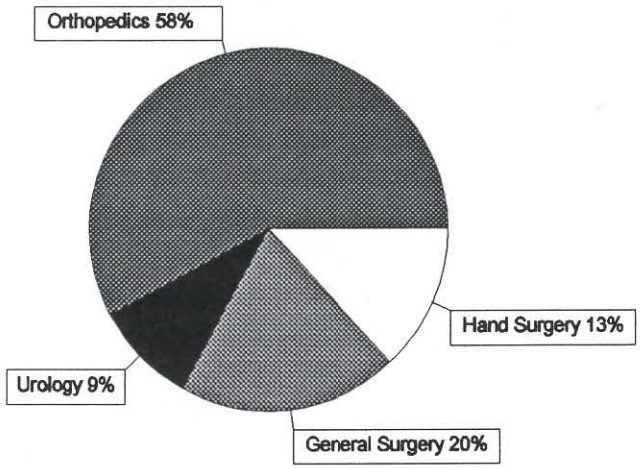


Figure 3

exploratory laparotomy for abdominal sepsis. A fatal cardiac arrest developed in the early postoperative period. Another patient with a major traumatic crush injury to the lower extremity was stabilized and immediately medevaced from the ship. This injury resulted in a subsequent below-knee amputation.

Discussion

Surgical care played a critical role in the medical support of the *Theodore Roosevelt* battle group while under way. In this review, almost 50 percent of all admissions to the ship's hospital ward involved a surgical condition. Nearly two-thirds of all patients medevaced from the ship carried a surgical diagnosis. Review of common urologic, orthopedic, and hand surgery conditions may help the surgeon treat and triage conditions that arise when a subspecialty consultation is not immediately available, such as during deployment periods.

Surgical procedures done under way are mostly elective, minor procedures such as vasectomy and circumcisions. These can be done safely and may take some burden off land-based medical facilities. These procedures not only make elective surgical care more accessible to the deployed sailor but also provide the operating team an opportunity to become familiar with the operating routine as well as allowing a periodic check of supplies and equipment.

Emergency surgery was uncommon while at sea. Part of the explanation for this low number may be due to the healthy population of seagoing sailors. A general surgeon can perform most emergent surgical procedures or stabilize the patient for immediate evacuation. There were no war-related or mass casualties encountered during the 3-year period of the review. Readiness for these scenarios cannot be assessed by this study.

Table 2
Complications of Surgical Procedures

Post Op Bleeding	4
Failed Spinal	3
Spinal Headache	2
Equipment Failure	1
Urinary Retention	1
Tourniquet Skin Blisters	1
Cardiac Arrest	1

PHAA Jeff Phillips

PHAA Jeff Phillips

Surgical complications during the period reviewed were few and within the expected range for the number and type of procedures performed. Since an outpatient chart review was not included in this study, posthospitalization complications were not identified unless the patients were readmitted to the ward or medevaced off the ship during the time of the review. This review may miss outpatient complications (such as wound infections and hematomas) but should identify any major complications.

The anesthesia provider plays an integral role in the delivery of surgical services at sea. Half of all cases performed used local anesthesia with or without the addition of sedation. Spinal anesthesia was the next most commonly employed technique. General anesthesia was used infrequently and limited to cases where other techniques were inappropriate or unsuccessful. Significant anesthetic complications were also rare and minor in nature. The diversity of cases performed dictates the anesthesia provider has the proper equipment and training for using all the commonly employed forms of anesthesia.

Antibiotics were used in 15 percent of all surgical admissions. This relatively low number reflects the large

Left and above: **An HH-46D Sea Knight picks up a pallet of supplies from *Theodore Roosevelt* during the carrier's enforcement of the no-fly zone over Bosnia-Herzegovina during Operation Deny Flight.**

An A-6E Intruder is ready for launch from *Theodore Roosevelt.*

PHC Denis Keske

percentage of elective, "clean" cases done during the period. Overall, the antibiotics administered were common, relatively inexpensive drugs. Antibiotic selection at sea is based on a combination of desired antimicrobial coverage and formulary availability. The formulary should contain an armamentarium of antibiotics that will be effective against the commonly encountered classes of organisms. Comparable alternatives are needed for patients allergic to the standard antibiotics. Stocking multiple, broad spectrum "latest generation" antibiotics may not add a significant advantage in this operational setting.

Blood use during at-sea periods is infrequent but may be needed emergently. Both cases in this review involved unexpected upper gastrointestinal bleeding. Use of the "walking blood bank" system appeared appropriate for the cases involved. The "walking blood bank" consists of on board preregistered donors of all possible blood types. When blood is needed, a suitable donor is contacted, the blood is drawn and cross-matched with the intended recipient. The process can be completed in about an hour. A certified technician is needed to obtain the blood.

Although no major traumatic injuries requiring the immediate transfusion of blood products occurred during the review period, the storage of a few units of blood for prompt transfusion would improve early resuscitation of the unexpected major trauma patient. This would require the scheduled rotation of blood products on and off the carrier as well as a specialized refrigeration unit. The practicality of developing such a resource needs further evaluation and is beyond the scope of this review.

Conclusion

Surgical support is an important part of the seagoing MTF. Surgical problems are common but surgical emergencies are rare. Orthopedic injuries are the most common surgical reason for medical evacuations. General surgical conditions are the most common reason for nonelective surgical admissions to the ship's medical ward.

Life-saving emergency surgical procedures can be performed by the surgical team aboard the carrier. Urgent procedures may be performed or deferred to a land-based facility at the discretion of the general surgeon. Nonelective surgery totals less than one-quarter of all surgery performed at sea. Minor elective surgery can be done under way with low morbidity.

Anesthesia support plays an integral role in performing surgery at sea. Personnel and supplies for all commonly performed types of anesthesia need to be available. Anesthetic care can be administered safely and with few complications.

With continuous upgrading of equipment and routine training of surgical team members, surgical support to seagoing personnel should remain safe and continue to complement the land-based medical facilities. ❑

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Contributory Support: *Just Do It!*

CDR Christina F. Rickenback, NC, USNR
HMC Christopher F. Butler, USN
HM1 James Cassidy, USN

We recall quite well the feeling in the early 1980's that training for our medical naval reservists would be greatly improved by removing drill sites from reserve centers and putting them into military treatment facilities (MTFs). When we approached the Navy medical active duty command structure with our plan, we were met with a granite response. Little did we surmise then that within a relatively short time we would be working in the MTFs providing support beyond what we had assumed our own capacity could be.

Today, all categories of medical reservists in paid, nonpay, and PRIMUS units provide valuable support to the fleet while gaining improved training by drilling regularly at an MTF. This requires close coordination and cooperation between the unit, the unit's parent reserve center, and the MTF. Our unit, now known in its fourth or fifth reincarnation as Naval Reserve Naval Hospital Portsmouth 201, since the early 1980's has been supported by and has supported Naval Hospital Groton, CT. This mutually beneficial relationship has been successful and has been maintained due to open and committed communication among the unit, the reserve center, and the hospital. This article will discuss in brief the mission of Naval Hospital Portsmouth 201, what we do, the impact we have, and thoughts for the future.

HMC Mark Subocz tests a patient for glaucoma.

Who Are We?

We are a Program 32 Naval Medical Reserve Unit whose gaining command is Naval Medical Center, Portsmouth, VA. Our unit is composed of a physician, nurses, administrative and allied health Medical Service Corps officers (dietitian, podiatrist, industrial hygienist), and Hospital Corps staff. In the past, we had physician's assistants, psychologists, chaplains, and medical technology (laboratory) officers assigned to our unit. It would not be cost-effective to transport the entire unit membership to Virginia for routine drills each month, or even on a quarterly basis. Having Naval Hospital Groton in our own backyard allows us to enhance training, provide services, and save valuable CHAMPUS dollars for the Navy.

Table 1
Reserve Support From Naval Hospital Portsmouth 201
to Naval Hospital Groton for July 1990 Through January 1993
(Exclusive of January Through May 1991 During ODS)

Provider	Type of Service	Number
Medical Officer	Adult Dependent Physicals	176
Medical Officer	Adult Dependent Physicals	16
Medical Officer	Adult Dependent Physicals	4
Medical Officer	Pediatric Physicals	19
Physician's Assistant	Adult Dependent Physicals	130
Physician's Assistant	Adult Dependent Physicals	3
Dermatologist	Dermatology	10
Podiatrist	Podiatry	203
Pediatric Nurse Practitioner	Pediatric Physicals	111
Total Patients Seen		672

What We Do

On any given weekend, Naval Hospital Portsmouth 201 staff can be found providing care to naval reservists, as well as to all categories of eligible beneficiaries active and retired at Naval Hospital Groton. Drilling is flexible and allows for rescheduling of individual drill periods during the week as well as on weekends, optimizing support to the hospital when needed. Augmenting such flexibility is an annual training period of 2 weeks or more during which time members of our unit are on active duty at the hospital. It is easy to see how we provide valuable services on both a routine and continuing basis.

A typical weekend drill is designed to optimize clinic time and on-the-job training with didactic (classroom) instruction and administration of reserve matters. The ratio is usually 3:1 in favor of clinic work. This design has been especially successful because treating patients on a monthly basis provides continuity for both patients and providers.

Most months, Saturday mornings are dedicated to completing reserve physical examinations mandated to occur on a specific schedule and only at an MTF. Although these physicals are usually routine, they provide our junior Hospital Corps staff with much-needed experience in performing phlebotomies, conducting EKGs, recording vital signs, providing audiological testing, completing standard forms and organizing clinic time. Corps staff rotate through various stations on a routine basis to increase their skills and allow for cross coverage when members are not in the clinic due to other Naval Reserve requirements (i.e., annual training, advancement exams). Corps staff also spend time in the emergency and orthopedic/podiatry departments or on the wards.

While the medical officer, nurses, and corps staff are providing reserve physicals, other clinics are also staffed. The dietitian and podiatrist see patients throughout the drill weekend, often without a break, except for lunch each day. After completing physical exams on a Saturday morning, the medical officer sees patients for school or work physicals, usually in the afternoon. On Sundays, we staff the clinics in order for the medical officers to assist Naval Hospital Groton with additional school or work physicals or special needs. The pediatric nurse practitioner (PNP), currently commanding officer of the unit, sees patients for school physicals on Sunday afternoon. The remainder of the drill weekend, unsurprisingly, finds her tending to administrative and training requirements. Often, the medical officer reschedules normal monthly drills in support of the Military Medicine Clinic at some other time of the month, during the week or on a different weekend. When a laboratory officer was assigned to the unit, the person often assisted Groton's lab staff by revising manuals and preparing for JCAHO/CAP surveys.

What Is the Impact of Our Presence?

While it may be difficult to calculate our impact in exact dollars and cents, the following tables illustrate the number of patients seen. Support to Naval Hospital Groton during Operations Desert Shield and Desert Storm (ODS) is presented separately due to mobilization of some of the health care providers during those periods.

Table 1 illustrates the number of patients cared for during the 3-year period (subtracting the months during which ODS intervened). The total was 672 patients. Even during ODS, with two practitioners mobilized, care was provided to 147 patients, as shown in Table 2. These statistics are only for Naval Hospital Portsmouth 201. Other units and practitioners also drilled at Groton's hospital then, and some continue to provide support today.

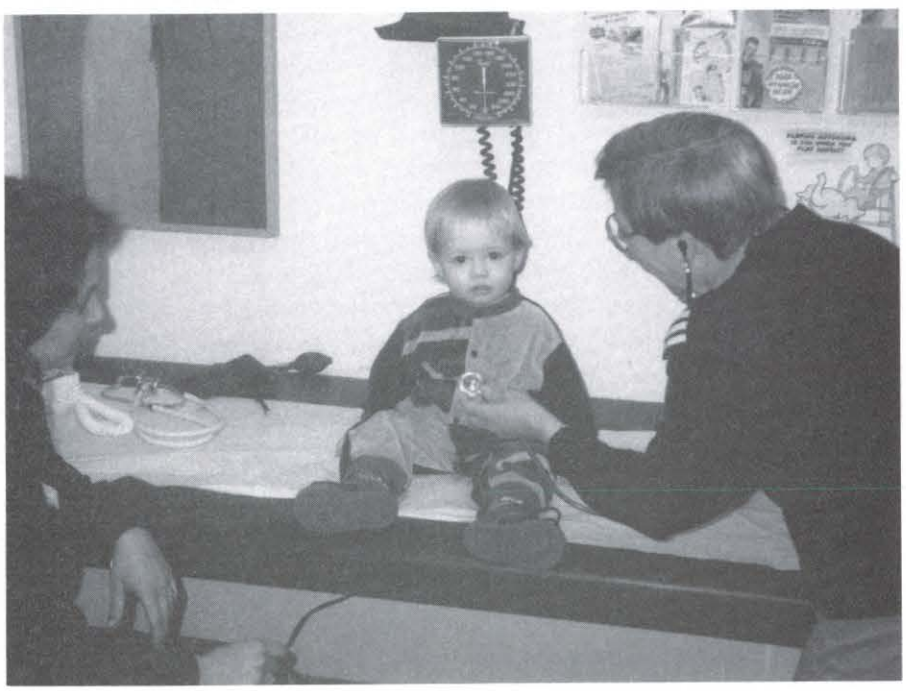
Table 2
Reserve Support From Naval Hospital Portsmouth 201
to Naval Hospital Groton During Operation Desert Storm
(January Through May 1991)

Provider	Type of Service	Number
Medical Officer	Adult Dependent Physicals	39
Medical Officer	Adult Dependent Physicals	11
Medical Officer	Pediatric Physicals	15
Physician's Assistant (Recalled to ODS Duty)	Adult Dependent Physicals	17
Podiatrist	Podiatry	47
Pediatric Nurse Practitioner (Recalled to ODS Duty)	Pediatric Physicals	18
Total Patients Seen		147

Estimating the precise CHAMPUS funds saved by this contributory support is difficult, as CHAMPUS dollars are expended according to the actual medical procedures performed and will vary according to regional norms. However, summary data for FY94 sheds some light on this issue and illustrates benefits beyond monetary implications.

During FY94, one of the major problems for the hospital was ensuring access to care for its entire catchment area. In midsummer, well-baby physicals were backed up as much as 12 weeks. At one time, PAP smears were 600 examinations in arrears. It was extremely difficult to gain access to the pediatric clinic if you were a patient or parent, which resulted in an overflow in the emergency room. This affected care in the emergency room as well as parent and patient perception of the quality of care they eventually received. Once patients were able to access the system, they generally had praise for the care.

Catchment area population is approximately 40,000 with a potential 50,000 at expansion post-BRAC realignment. An average of 44 clinicians care for an estimated 242,000 patient visits per year. Reserve clinicians treated approximately 600 documented patients (the reserve liaison officer (RLO) feels the actual number is probably higher due to discrepancies in the documentation by some providers). In addition, approximately 300 reservist physicals and immunizations were administered. These statistics do not include relief provided to hospital staff by nonclinical reservists. Sixty-three reservists performed their active duty at Naval Hospital Groton, working in the operating room, audiology, Military Medicine and Ambulatory Care Clinics, and other areas throughout the hospital for a total of 554 hours. In summation, what reserve contributory support best accomplishes is increasing patient access to quality care, increasing readiness of the reserve force regionally, and providing relief and support for the active duty staff.



CDR Christina Rickenback shows a young patient her stethoscope.

What Are Some of the Administrative Issues Involved in Mutual Support?

Coordination is extremely important in organizing care provided in the various clinics. The RLO is an invaluable resource for organizing, planning, and implementing reserve-active interaction. Monthly, the RLO is provided with a list of the care providers who will be staffing the clinics the following month. The RLO forwards this information to the appropriate

LCDR Richard Gorecki, the reserve unit's podiatrist, examines a patient.

active component staff responsible for scheduling patients for appointments. Any difficulties encountered during the weekend or any followup needs are arranged through the RLO.

Command support and a formal Memorandum of Understanding (MOU) are crucial. Liaison between reservists and various clinic staff, and support of active duty personnel, ensures continuity of care for the patient and that further evaluation when necessary is prompt. Procedures for documenting man-hours and usage of supplies are also important in planning future budgets. A budget that includes funds only for active duty practitioners will be inadequate. Credentialing of health care providers is also mandatory as well as quality assurance through a chart review process.

The commanding officer of the relevant reserve center must be flexible and must focus on "the big picture"—the One Navy concept. Admittedly, training is the primary responsibility of the reserve program, but contributory support provides training for mobilization and also valuable services now, not in some theoretical future during wartime. Training to the individual training plan (ITP) for each reservist, general military training (GMT), administrative reporting, and liaison activity between the RLO and the reserve center must be accomplished. Having the MTF as the primary drill site puts the appropriate emphasis on mobilization training and liaison with active duty medical groups (i.e., "life in the real world"), rather than training in the isolation of an inappropriately equipped reserve center.

HM3 Francine St. Jacques draws a blood sample.

What Lies Ahead?

In a time of "rightsizing," BRAC closures, and general flux in the military, optimizing all our resources is of the highest importance. Proper utilization of reserve assets serves as a force multiplier for the active component, helps to save CHAMPUS dollars, increases access to care, and improves morale for the receivers of care as well as the givers. The services we provide today, as we have in the past decade and a half, are dependent upon our personnel and the patient population served by the hospital. The options for care provided by other personnel at other sites depends upon their specific needs and circumstances. In any event, contributory support is beneficial to all concerned. Hopefully, what we have accomplished can inspire us all to "bloom where we are planted." ❑

CDR Rickenback is former commanding officer for Naval Hospital Portsmouth 201, Portsmouth, VA. HMC Butler is former reserve liaison officer at Naval Hospital Groton, CT. HM1 Cassidy is former reserve liaison officer at the same facility.

A Case for Continued Combat Stress Casualty Care Training

CDR Dennis P. Wood, MSC, USNR
CDR Dean D. Hager, MSC, USNR

Stretching from California's Channel Islands to the Mexican border, Exercise Kernel Blitz '95 was one of the largest joint task force exercises conducted by the U.S. Third and Pacific Fleet Commands.(*1*) More than 12,000 sailors and marines participated in this 3-week event; exercising 23 ships (including USNS *Mercy*), an embarked Marine amphibious brigade, and a multitude of electronic warfare, special operations, and countermine personnel. Within this mix were over 1,200 active duty and reserve medical personnel whose job, in addition to their normal health support missions, was the preparation for an extensive medical subexercise, EX Charlie Golf-One.

Conceived by CINCPACFLT's Deputy Surgeon, RADM Eugene Fussell, MC, EX Charlie Golf-One provided an excellent opportunity for Force Commanders to exercise their combat health service support (HSS) personnel over a 4-day period in direct support of an amphibious force beach assault. The event involved the injection of over 200 fully moulaged combat casualty actors and an additional 175+ displaced civilian actors onto the battlefield, thus providing both line and support personnel the problems naturally occurring when wounded or ill impact an engaged fighting force. Medical staffs, beginning with USMC unit corpsmen (HM 8404), worked in realistic conditions, both on ground and at sea, and conducted the transfer and care for casualties from echelons I (aid station) through IV (fleet hospital). Evaluation at each echelon and platform was provided by Casualty Evaluation Groups (CEGs) consisting of two senior physicians, one to two nurses, one to two MSC's, and one to two HMC's. Significant to this event and integral with an accurate evaluation of the system's ability to support a combat force was the field injection (and subsequent care) of several combat stress cases.

A Historical Perspective

In January 1918 "nervous mental disease specialists" were assigned by the U.S. War Department to field commands in France.(*2-4*) Soldiers suffering from what was then termed "war neuroses" were treated near the forward edge of battle in field hospitals using basic principles of encouragement and rest, coupled with gentle persuasion to return to their unit. This initial treatment model resulted in 65-75 percent of these patients returning to frontline duty. Over 69,000 U.S. war neuroses patients were treated during America's involvement in World War I.

By September 1942 it was necessary for the U.S. Army to reestablish the position of division psychiatrist as our forces were again subject to the stressors of prolonged combat in Europe and the Pacific. Using the same treatment model as in World War I, approximately 50-75 percent of combat neuroses patients were returned to full duty. By the wars end, over 90 percent of these cases were returned to full duty, with 60 percent back within their own division. When one considers that approximately 30 percent of all casualties during World War II were combat neuroses, the necessity of clear "neuropsychiatric treatment protocols" becomes evident. These protocols of brevity, immediacy, centrality, expectancy, proximity, and simplicity (BICEPS) result in treatment effectiveness providing an enormous benefit to overall combat force sustainment.

By 1953 and with the Korean Conflict raging, BICEP protocols were again refined with 97 percent of all combat stress casualties (then called "psychiatric casualties") returned to duty with approximately 88 percent returned within their own division. This success rate continued throughout the late 1960's and early '70's in Vietnam with only 5-6 percent of all to CONUS medical evacuees being of a psychiatric nature.

More recently, the defense of Kuwait involved Joint Staff planning for deployment of a combined (multination) and joint (multiservice) task force to Saudi Arabia as a prelude to Desert Storm. This event, Operation Desert Shield, also integrated combat psychiatric care within the CINCCENT Medical Planning Cell from the onset. Driving their involvement were initial discussions of potential casualties if (or when) hostilities were to break out. Preliminary estimates were that combat stress patients could run as high as a 1:2 ratio compared to combat trauma and comprise up to 20 percent of all personnel medevaced to CONUS.(*5*) A USMC reference also estimated the proportion of combat stress casualties to wounded in prolonged engagements could run as high as 44 out of 100.(*6*) By addressing combat stress issues in the normal medical planning process, by the execution date of Operation Desert Storm, in-garrison mental health programs were already established and directly managing precombat stressors.(*7-11*).

Fortunately, due to the relatively short active combat times to which marines and sailors were exposed, significant numbers of combat stress casualties were not seen at echelon II and III medical treatment facilities (MTFs). However, in-theater combat stress platoons (CSPs) did a measurable volume of business in assisting the treatment of combat stress and providing related education.(*9,11*) These actions were especially important given the reality of additional mass casualty events, the handling or viewing of the dead, and individual reactions to an "anticipation of trauma."(*12-15*) Recent reports have also pointed to the fact that approximately 5 percent of Desert Storm veterans are experiencing difficulties directly related or secondary to post-traumatic stress disorder.(*16-18*) It may be inferred from this that without the proper preplanning and subsequent deployment of combat stress platoons that occurred, the number of stress casualties could have been significantly higher.

Charlie Golf-One

During the consolidation phase of the Kernel Blitz amphibious assault, elements of the First Medical Battalion, 1st FSSG, established a Fleet Marine surgical company ashore.(*19*) Tasked with direct support of USMC ground forces, this facility would be the first to handle large numbers of wounded or ill marines from more forward areas. Integral to the first series of casualty actors received were five individuals displaying varying symptoms of combat stress. As each was presented to the triage section, a modified CSP (consisting of one psychiatrist/one psychologist, and three HM psychiatric technicians) was called in to evaluate each casualty and develop an appropriate care plan. One interesting element was the medical staff's initial lack of experience in the time-intensive handling of psychiatric cases when received simultaneously alongside much more visibly wounded personnel.

As the exercise progressed however, triage and CSP personnel blended extremely well with the stress cases providing excellent training for platoon members as well as medical and security (MAA) personnel. This was best borne out in one particular case when all personnel had to work together to handle successfully one marine actor presenting himself as disoriented, weapon in hand along with a concealed explosive device. Senior medical evaluator for the ground combat element, CAPT John Downs, MC, stated, "these realistic stress cases thrown into a combat triage scenario provided some of the best practical case management training I have seen encountered outside of brick and mortar medical facilities!"(*1*) Forward of this surgical company, combat-related stress was also being addressed by Fleet Marine hospital corpsmen (NEC 8404) as they encountered large numbers of displaced civilians (actors). Corpsmen assigned to both USMC combat platoons and civil affairs teams received outstanding training in proper use of BICEP-based protocol for field management of these types of cases having an impact on their unit's time and mobility. CEG team evaluators received several positive comments from USMC platoon leaders and company commanders, particularly their better appreciation of proper deployment of their company corpsmen "docs" when similar situations occur. As one marine captain stated, "Without testing this stuff, how can we begin to understand the capabilities of FMF combat stress support? It sure opened my eyes to civil affairs problems too."

Future CSP Training Recommendations

Joint task force exercises such as Kernel Blitz afford excellent opportunities for medical training events such as Charlie Golf-One to occur. Paramount to such medical readiness training is the active integration of combat stress case management at all participating health care

echelons. Functional use of combat stress platoons can be best task organized as follows: (a) inpatient care, (b) outpatient care, (c) combat fitness retraining, and (d) preventive mental health program management. Additional possible training components are: (e) self-care for CSP personnel and (f) displaced civilian preventive mental health intervention/case assessment.

While CSP activities dealing with inpatients are relatively straightforward, significant exercise training can be for assessment and short-term management of service personnel cases likely to be encountered on a deployment (i.e., significant alcohol misuse, psychotic breaks, and suicide ideation's associated with either affective or personality disorders). Training of MTF staff is also of value regarding the identification of behavioral signs associated with depression, anxiety, and/or panic secondary to their illness or wounds. Of all staff training elements, combat retraining is not usually given a chance for exercise play. If preplanned into a major exercise, participating medical commanders can arrange for stress platoon training in BICEPS as well as orient treatment facility staff to this treatment model. This allows precious field exercise time for practical testing of skills previously acquired. The point must be made for an equal need for practice in assessing civilian populations. By integrating CSP capabilities with participating Civil Affairs Units, combat stress case management training can be tracked linearly from the battle's forward edge through each applicable echelon of care.

Medical planners, unit commanders, and caregivers must remain mindful of the importance the CSP has in the overall "readiness" scheme. While not an element that drives an exercise, by its very nature and potential, combat stress must be considered an integral factor in any combat direct-support exercise.

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Correction

In "NAMRU-2 In Action" published in *Navy Medicine* March-April 1996, the author was inadvertently omitted. The article and photos are by CAPT Phil Strub, USNR. He is assigned to Staff, Director of Naval Reserves N095.

Naval Medical Research and Development Command Highlights

●Potential White Blood Cell Transfusion Therapy

White blood cells form the basis of the immune system. Failure of the immune system can lead to increased susceptibility to infection and disease as in the case of patients with HIV infection. A research team from the Naval Medical Research Institute (NMRI), Bethesda, MD, has discovered a new method that permits growth of white blood cells (specifically CD 4 T cells) in the laboratory using blood from patients with HIV infection. The team, made up of Navy, Army, and civilian immunologists and virologists, discovered a method of triggering a cascade of biochemical reactions allowing white blood cells to grow 8,000-fold and at the same time dramatically decreasing the amount of HIV in the cell cultures. An FDA phase I clinical trial to test the safety and feasibility of a transfusion therapy is planned to begin at NMRI. This discovery may lead to the development of a new therapeutic option for patients with HIV infection and for patients with other forms of immune deficiencies or cancer.

●Recruit Training Injuries and Costs

Musculoskeletal injuries are the most common injury for those who participate in sports and exercise. These injuries are a leading cause of patient visits, lost training time, and reduced operational readiness in military forces. At the Marine Corps Recruit Depot, San Diego, CA, studies demonstrated an annual loss of 53,600 injury-related training days at a cost of $16 million. A research team from the Naval Health Research Center, San Diego, is working closely with Marine Corps, Navy, and Special Operations personnel on an aggressive program to reduce the incidence of musculoskeletal injuries. The team includes Navy sports medicine and operational experts and research partners from Johns Hopkins University, University of California, and Children's Hospital, San Diego. This program includes data collection systems at major training facilities that document the incidence and nature of injuries, risk factor profiles for injury susceptibility, and interventions to reduce injuries. For example, the team used dual-energy X-ray absorptiometry to derive structural bone geometry as a potential predictor of stress fractures. This and other information derived from the injury monitoring program has led to the development of scientifically-based interventions to reduce injuries at the Marine Corps Recruit Depot. An evaluation of the current program demonstrated an overall reduction in overuse injuries and a 50 percent reduction in stress fractures, with no decrement in physical fitness at graduation. Related efforts are focused on the development of improved footwear and expanding the program to include the Naval Recruit Training Center, Great Lakes, IL; the Marine Corps Recruit Depot, Parris Island, SC, and various operational commands.

●Clinical Trials of *Campylobacter* Vaccine

Campylobacter is a bacteria that causes approximately 400-500 million cases of gastroenteritis and diarrhea throughout the world each year. Also, *Campylobacter* is considered to cause one of the most severe forms of travelers' diarrhea. The Naval Medical Research Institute, Bethesda, MD, is a partner in a Cooperative Research and Development Agreement (CRADA) with MicroCarb Inc. of Gaithersburg, MD, and they have successfully completed a clinical trial that demonstrated the safety and immunogenicity of a *Campy-lobacter* vaccine. The CRADA partner's research focuses on inhibiting the growth of bacteria by developing a vaccine that interrupts the process by which bacteria grow utilizing nutrients at the mucosal surface. The vaccine provides prevention and treatment because it interrupts the process by which bacteria infect healthy cells at the initial stages of infection. The Navy will continue to support MicroCarb's vaccine development through the clinical stages because it holds great potential to the operational readiness of deployed military personnel.

For more information on these and other research efforts contact Doris M. Ryan, Deputy Director, External Relations, at DSN 295-0815, Commercial 301-295-0815, FAX 301-295-4033, or E-mail ryand@mail-gw.nmrdc.nnmc.navy.mil.

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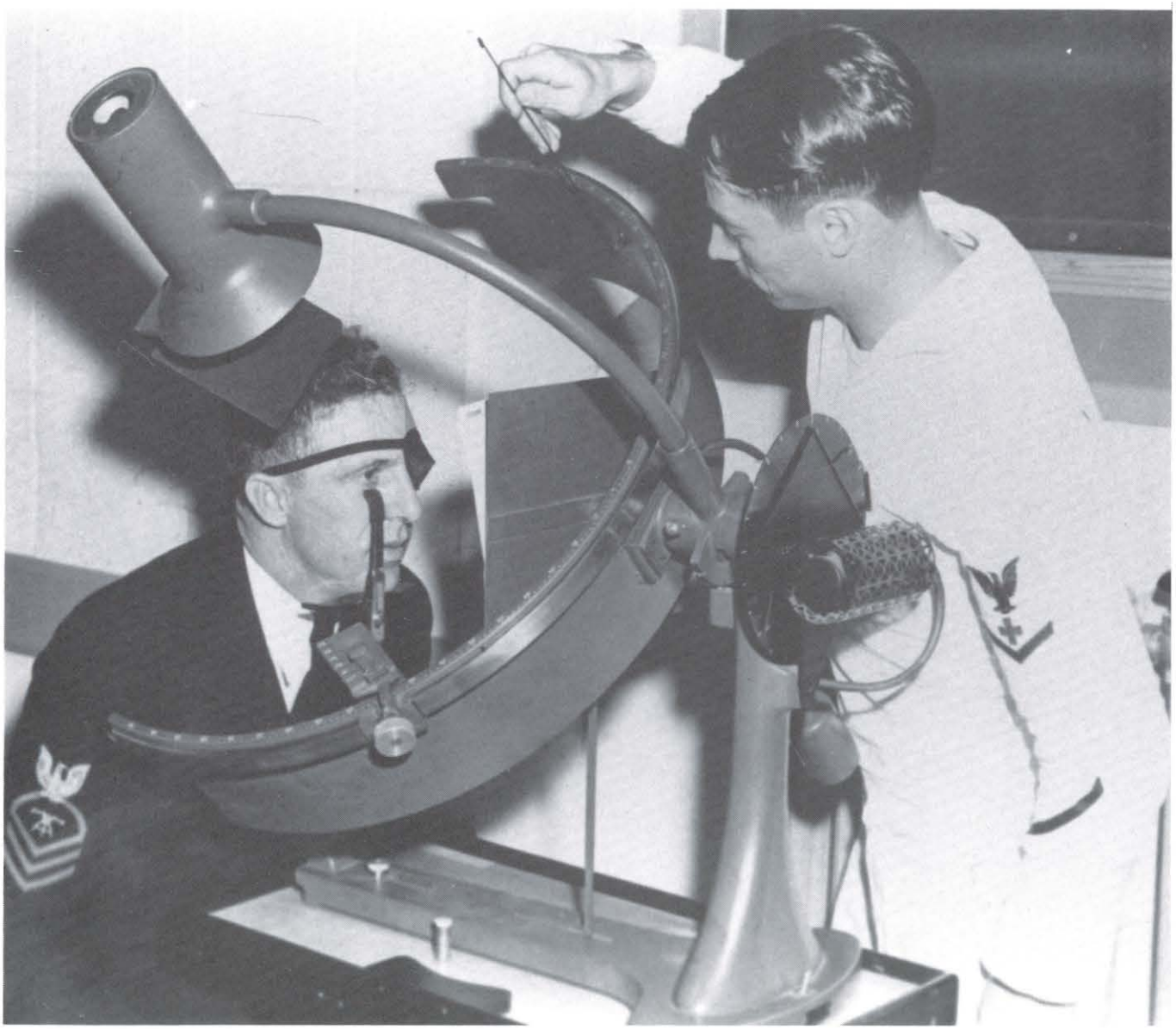

BUMED Archives

A perimeter instrument is used to determine a patient's range of vision.

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